

**Remarks**

The Office Action mailed December 23, 2005 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 8-20 are pending in this application. Claims 8-10 and 15-18 stand rejected. Claims 1-7 are now canceled. Claims 11-14, 19, and 20 have been withdrawn. Claim 21 is newly added. No fee is believed due for the newly added claim.

The objection to Claim 17 is respectfully traversed. Specifically, Claim 17 has been amended at line 3 to recite “said combustor.” No new matter has been added. Accordingly, Applicants respectfully request that the objection to Claim 17 be withdrawn.

The rejection of Claims 8-10 and 15-18 under 35 U.S.C. §102(b) as being anticipated by Dyste et al. (U.S. Patent No. 3,222,864) is respectfully traversed.

Dyste et al. describe a gas turbine engine-recuperator combination (10) wherein the recuperator (14) includes an annular heat exchanger (56) that is positioned coaxially within turbine casing (16) in the exhaust end of the turbine engine (12). Exhaust gases discharged from the turbine engine (12) are channeled through heat exchanger (56). Heat exchanger (56) includes a bundle of heat transfer tubes (60) that are arranged about a central exhaust by-pass opening (96) extending through recuperator (14). More specifically, the heat transfer tubes (60) are each oriented substantially parallel to the exhaust flow such that the exhaust gases discharged from turbine engine (12) flow through heat transfer tubes (60).

Claim 8 recites a heat exchanger assembly for a gas turbine engine, wherein the heat exchanger assembly comprises “an annular heat exchanger . . . said heat exchanger comprising a plurality of heat exchanger elements aligned substantially perpendicular to a direction of exhaust flow discharged from the gas turbine engine.”

Dyste et al. do not describe nor suggest a heat exchanger assembly for a gas turbine engine as is recited in Claim 8. Specifically, Dyste et al. do not describe nor suggest a heat exchanger comprising a plurality of heat exchanger elements that are aligned substantially

perpendicular to the direction of exhaust flow. Rather, in contrast to the present invention, Dyste et al. describe a heat exchanger that includes a bundle of heat transfer tubes that are each aligned substantially parallel to the flow of exhaust gases discharged from the turbine engine.

Accordingly, for at least the reason above, Claim 8 is submitted to be patentable over Dyste et al.

Claims 9, 10, 15 and 16 depend, directly or indirectly, from independent Claim 8. When the recitations of Claims 9, 10, 15 and 16 are considered in combination with the recitations of Claim 8, Applicants submit that dependent Claims 9, 10, 15 and 16 likewise are patentable over Dyste et al.

Claim 17 recites a gas turbine engine comprising “a turbine . . . an annular heat exchanger comprising a plurality of heat exchanger elements . . . said plurality of heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing.”

Dyste et al. do not describe nor suggest a gas turbine engine as is recited in Claim 17. Specifically, Dyste et al. do not describe nor suggest a gas turbine engine comprising an annular heat exchanger comprising a plurality of heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing. Rather, in contrast to the present invention, Dyste et al. describe a heat exchanger that includes a bundle of heat transfer tubes that are each aligned substantially parallel to the flow of exhaust gases discharged from the turbine engine. Accordingly, for at least the reason above, Claim 17 is submitted to be patentable over Dyste et al.

Claim 18 depends directly from independent Claim 17. When the recitations of Claim 18 are considered in combination with the recitations of Claim 17, Applicants submit that dependent Claim 18 likewise is patentable over Dyste et al.

For at least the reasons set forth above, Applicants respectfully request that the 35 U.S.C. §102(b) rejection of Claims 8-10 and 15-18 as being anticipated by Dyste et al. be withdrawn.

The rejection of Claims 8-10 and 15-18 under 35 U.S.C. §102(b) as being anticipated by Beam, Jr. et al. (U.S. Patent No. 3,386,243) is respectfully traversed.

Beam, Jr. et al. describe an aircraft turboprop engine that includes a compressor (5), a diffuser (6), a combustion apparatus (7), a turbine (9), and an exhaust system coupled to receive discharge flow from the turbine. The exhaust system includes a recuperator (10) and terminates in an outlet (11) oriented such that air discharged from the diffuser (6) to the recuperator (10) flows through pipes (13) spaced around the outer perimeter of the engine and the heated air is returned to the combustion apparatus (7) through pipes (14). Notably, Beam, Jr. et al. do not describe any orientation regarding elements within the annular recuperator structure (18), but it appears that the recuperator (18) does not include a plurality of heat exchanger elements that are aligned substantially perpendicular to a direction of exhaust flow (21) discharged from the gas turbine engine.

Claim 8 recites a heat exchanger assembly for a gas turbine engine, wherein the heat exchanger assembly comprises “an annular heat exchanger . . . said heat exchanger comprising a plurality of heat exchanger elements aligned substantially perpendicular to a direction of exhaust flow discharged from the gas turbine engine.”

Beam, Jr. et al. do not describe nor suggest a heat exchanger assembly for a gas turbine engine as is recited in Claim 8. Specifically, Beam, Jr. et al. do not describe nor suggest a heat exchanger comprising a plurality of heat exchanger elements that are aligned substantially perpendicular to a direction of exhaust flow discharged from the gas turbine engine. Rather, in contrast to the present invention, Beam, Jr. et al. describe an annular recuperator but do not describe nor suggest an orientation of any elements within the recuperator. Specifically, at column 2, lines 24-26, Beam, Jr. et al. describe that the details of the annular recuperator structure are immaterial to their invention. Accordingly, for at least this reason, Claim 8 is submitted to be patentable over Beam, Jr. et al.

Claims 9, 10, 15 and 16 depend, directly or indirectly, from independent Claim 8. When the recitations of Claims 9, 10, 15 and 16 are considered in combination with the recitations of Claim 8, Applicants submit that dependent Claims 9, 10, 15 and 16 likewise are patentable over Beam, Jr. et al.

Claim 17 recites a gas turbine engine comprising “a turbine . . . an annular heat exchanger comprising a plurality of heat exchanger elements . . . said plurality of heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing.”

Beam, Jr. et al. do not describe nor suggest a gas turbine engine as described in Claim 17. Specifically, Beam, Jr. et al. do not describe nor suggest a gas turbine engine comprising an annular heat exchanger comprising a plurality of heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing. Rather, in contrast to the present invention, Beam, Jr. et al. describe an annular recuperator but do not describe nor suggest an orientation of any elements within the recuperator. Specifically, at column 2, lines 24-26, Beam, Jr. et al. describe that the details of the annular recuperator structure are immaterial to their invention. Accordingly, for at least this reason, Claim 17 is submitted to be patentable over Beam, Jr. et al.

Claim 18 depends directly from independent Claim 17. When the recitations of Claim 18 are considered in combination with the recitations of Claim 17, Applicants submit that dependent Claim 18 likewise is patentable over Beam, Jr. et al.

For at least the reasons set forth above, Applicants respectfully request that the 35 U.S.C. §102(b) rejection of Claims 8-10 and 15-18 as being anticipated by Beam, Jr. et al. be withdrawn.

The rejection of Claims 8-10 and 15-18 under 35 U.S.C. §103 as being unpatentable over Zirin (U.S. Pat. No. 3,201,938) in view of either Beam, Jr. et al. (U.S. Pat. No. 3,386,243) or Dyste et al. (U.S. Pat. No. 3,222,864) is respectfully traversed.

Beam, Jr. et al. and Dyste et al. are described above.

Zirin describes a heat exchanger in a passageway (15) connecting a turbine (13) to a powerplant discharge opening (16). In the recuperator, exhaust fluid from the turbine (13) flows in heat exchange relationship with compressed fluid ducted from the discharge portion (26) of the powerplant compressor (11). The heated compressed fluid is directed from the recuperator to

an inlet portion (28) of the powerplant combustor (12). The exhaust fluid is channeled through the passageway (15) and is directed over the outer surfaces of a plurality of axially extending heat exchange members (22). Notably in Zirin, the heat exchange members (22) appear to be oriented substantially parallel to the direction of exhaust flow.

Claim 8 recites a heat exchanger assembly for a gas turbine engine, wherein the heat exchanger assembly comprises “an annular heat exchanger. . . said heat exchanger comprising a plurality of heat exchanger elements aligned substantially perpendicular to a direction of exhaust flow discharged from the gas turbine engine.”

None of Zirin nor Beam, Jr. et al. nor Dyste et al., considered alone or in combination, describe or suggest a heat exchanger assembly for a gas turbine engine as is recited in Claim 8. More specifically, none of Zirin nor Beam, Jr. et al. nor Dyste et al. considered alone or in combination, describe or suggest a heat exchanger comprising a plurality of heat exchanger elements that are aligned in a substantially perpendicular manner to the direction of exhaust flow. Rather, in contrast to the present invention, Zirin describes a heat exchanger positioned such that exhaust fluids are discharged through the exhaust passageway and directed over the outer surfaces of heat exchange members that are substantially parallel to the flow of exhaust fluid, Beam, Jr. et al. describe an annular recuperator but do not describe nor suggest an orientation of any elements within the recuperator structure, and Dyste et al. describe a heat exchanger that includes of a bundle of heat transfer tubes that are each aligned substantially parallel to the flow of exhaust gases discharged from the turbine engine.

Since none of Zirin, Beam, Jr. et al., nor Dyste et al. describe or suggest a heat exchanger comprising a plurality of heat exchanger elements that are aligned substantially perpendicular to a direction of exhaust flow discharged from the gas turbine engine, it follows that no combination of these three patents would describe or suggest the present invention. Accordingly, for at least this reason, Claim 8 is submitted to be patentable over Zirin in view of Beam, Jr. et al. or Dyste et al.

Claims 9, 10, 15 and 16 depend, directly or indirectly, from independent Claim 8. When the recitations of Claims 9, 10, 15 and 16 are considered in combination with the recitations of

Claim 8, Applicants submit that dependent Claims 9, 10, 15 and 16 likewise are patentable over Zirin in view of Beam, Jr. et al. or Dyste et al.

Claim 17 recites a gas turbine engine comprising “a turbine . . . an annular heat exchanger comprising a plurality of heat exchanger elements . . . said plurality of heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing.”

None of Zirin nor Beam, Jr. et al. nor Dyste et al., considered alone or in combination, describe or suggest a gas turbine engine as described in Claim 17. More specifically, none of Zirin nor Beam, Jr. et al. nor Dyste et al. considered alone or in combination, describe or suggest heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing. Rather, in contrast to the present invention, Zirin describes a heat exchanger positioned such that exhaust fluids are discharged through the exhaust passage way and directed over the outer surfaces of heat exchange members that are substantially parallel to the flow of exhaust fluid, Beam, Jr. et al. describe an annular recuperator but do not describe nor suggest an orientation of any elements within the recuperator, and Dyste et al. describe a heat exchanger that includes a bundle of heat transfer tubes that are each aligned substantially parallel to the flow of exhaust gases discharged from the turbine engine.

Since none of Zirin, Beam, Jr. et al., nor Dyste et al. describe or suggest heat exchanger elements aligned in an approximate sinusoidal arrangement extending around an inner periphery of an outer casing, it follows that no combination of these three patents would describe or suggest the present invention. Accordingly, for at least this reason, Claim 17 is submitted to be patentable over Zirin in view of Beam, Jr. et al. or Dyste et al.

Claim 18 depends directly from independent Claim 17. When the recitations of Claim 18 are considered in combination with the recitations of Claim 17, Applicants submit that dependent Claim 18 likewise is patentable over Zirin in view of Beam, Jr. et al. or Dyste et al.

Notwithstanding the above, the rejection of Claims 8-10 and 15-18 under 35 U.S.C. §103(a) as being unpatentable over Zirin in view of Beam, Jr. et al. or Dyste et al. is further traversed on the grounds that the Section 103 rejection of the presently pending claims is not a

proper rejection. Obviousness cannot be established by merely suggesting that it would have been obvious to one of ordinary skill in the art to modify the structure of Zirin by applying the teachings of Beam, Jr. et al. or Dyste et al. More specifically, as is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Rather, the present Section 103 rejection appears to be based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention. Since there is no teaching nor suggestion in the cited art for the claimed combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants respectfully request that the Section 103 rejection be withdrawn.

Furthermore, in contrast to the assertion within the Office Action, Applicants respectfully submit that it would not be obvious to one skilled in the art to combine Zirin with Beam, Jr. et al. or Dyste et al. because there is no motivation to combine the references suggested in the art. Rather, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicants' own teaching.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. *Ex parte Levingood*, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. *In re Vaeck*, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

For at least the reasons set forth above, Applicants respectfully request that the 35 U.S.C. §103 rejection of Claims 8-10 and 15-18 be withdrawn.

Newly added Claim 21 depends from independent Claim 8. When the recitations of Claim 21 are considered in combination with the recitations of Claim 8, Applicants submit that Claim 21 likewise is patentable over the cited art.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully submitted,

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